

CLAIMS

- 1 A method of stabilising an underground formation surrounding a borehole comprising placing a treatment fluid in the formation, the treatment fluid comprising cross-linkable polymer and a cross-linking agent, and allowing the treatment fluid to gel in-situ, characterised in that after placement of the treatment fluid in the formation, an activator fluid is pumped into the well to accelerate the crosslinking of the polymer and the development of the gel strength.
- 2 The method of claim 1, wherein the reaction between the activator and the treatment fluid is not exothermic.
- 3 The method of claim 1 or 2, wherein the cross-linkable polymer is a polymer containing acrylamide functional groups.
- 4 The method of claim 3, wherein the polymer comprises polyacrylamide, partially hydrolysed polyacrylamide or copolymers of acrylamides and acrylates.
- 5 The method of claim 3 or claim 4, wherein the polymer is a partially hydrolysed polymer with a molecular weight of around 500,000.
- 6 The method according to any preceding claim, wherein the cross-linking agent is a molecule or complex containing a reactive transition metal cation.
- 7 The method of claim 6, wherein the cross-linking agent is a zirconium lactate solution.
- 8 The method according to any preceding claim, wherein the activator comprises a solution of zirconium chloride or zirconium acetate.
- 9 The method of claim 7, wherein the activator comprises a 5-20% solution of zirconium chloride in seawater.
- 10 A method according to any preceding claim, wherein the activator and/or treatment fluid includes colloidal silica.
- 11 The method according to any preceding claim, wherein the treatment fluid has a viscosity of up to 300 cp.
- 12 The method of drilling a well, wherein the stabilization treatment according to any of claims 1 to 11 is carried out during the drilling of the well.
- 13 The method according to any preceding claim, whereby the treatment fluid and the activator are sequentially into the well through a drill string.

- 14 The method of claim 13, wherein the sequence is repeated.
- 15 The method of claim 13 or claim 14, wherein the treatment fluid and the activator are separated from each other by spacer fluids.
- 16 The method as claimed in any of claims 12 to 15, wherein the fluids are applied to the zone of interest by means of a placement tool placed in the drill string which injects the fluids into the zone of interest via ports, while mechanically compressing the wall of the well by means of structures formed on the outside of the placement tool which act on the borehole wall as the drill string rotates.
- 17 The method as claimed in any of claims 12 to 16, wherein the activator is stored in a downhole reservoir located near the bottom of the drill string and arranged to inject slugs of activator into a drilling fluid.
- 18 The method as claimed in any preceding claims, wherein the bottomhole well temperature ranges from about 4°C to about 25°C.